<u>IN THE CLAIMS:</u>

This listing of claims will replace all prior versions, and listing, of claims in the application.

<u>Listing of the Claims:</u>

CLAIMS

1. (Currently amended) Apparatus for measuring the temperature of a flowing fluid comprising; a device comprising a structure bearing two <u>adjacent</u> temperature sensitive elements adapted to be temporarily exposed to <u>substantially</u> the <u>same</u> fluid <u>flow conditions in use of the device</u> and without means for substantially preheating one of said elements relative to the other, wherein the structure provides respective regions for the diffusion of heat <u>between</u> ~~from~~ the fluid <u>and the structure</u> through the respective said elements, <u>and</u> the thermal products within <u>said</u> ~~which~~ regions differ such that, in use, said elements experience different heat transfer rates <u>due to such diffusion</u> when exposed to the same fluid temperature; means for monitoring the respective temperatures of said elements over a period; and computational means to derive from respective changes of temperature of said elements the respective heat transfer rates experienced thereby and to derive the temperature of the fluid from a relationship of the temperatures of said elements and the derived heat transfer rates.

2. (Previously presented) Apparatus according to claim 1 wherein said temperature sensitive elements are thin film resistance thermometers.

3. (Previously presented) Apparatus according to claim 1 wherein said structure comprises a member of a selected material the thickness of which differs in the respective said regions.

4. (Previously presented) Apparatus according to claim 3 wherein said structure comprises a member having an internal cavity at a selected location, a first of the temperature sensitive elements being borne on part of the surface of said member which overlies said cavity and the

second of the temperature sensitive elements being borne on part of the surface of said member which does not overly said cavity.

5. (Previously presented) Apparatus according to claim 3 wherein said material is a glass, ceramic or quartz.

6. (Previously presented) Apparatus according to claim 1 wherein said structure comprises a tubular member of a first material surrounding a member of a second material over part of its length and surrounding a cavity over another part of its length, the second material having a higher thermal product than the first material, a first of the temperature sensitive elements being borne on part of the surface of the said tubular member which overlies said cavity and the second of the temperature sensitive elements being borne on part of the surface of said tubular member which overlies said member of second material.

7. (Previously presented) Apparatus according to claim 6 wherein said first material is a glass, ceramic or quartz and said second material is a metal.

8. (Previously presented) Apparatus according to claim 4 wherein said cavity contains a gas, gas mixture or vacuum.

9. (Previously presented) Apparatus according to claim 1 wherein said structure comprises a member composed of first and second materials having first and second thermal products at first and second locations respectively, a first of the temperature sensitive elements being borne on part of the surface of said member at said first location and the second of the temperature sensitive elements being borne on part of the surface of said member at said second location.

10. (Previously presented) Apparatus according to claim 9 wherein said first material is a glass or quartz and said second material is a ceramic.

11. (Currently amended) A method of measuring the temperature of a flowing fluid which comprises temporarily exposing to the fluid a device comprising a structure bearing two adjacent temperature sensitive elements such that said elements are exposed to substantially the same fluid flow conditions, without substantially preheating one of said elements relative to the other, said structure providing respective regions for the diffusion of heat between ~~from~~ the fluid and the structure through the respective said elements, and the thermal products within ~~which~~ said regions differ such that said elements experience different heat transfer rates due to such diffusion when exposed to the same fluid temperature; monitoring the respective temperatures of the temperature sensitive elements of such device over a period; deriving from respective changes of temperature of said elements the respective heat transfer rates experienced thereby; and deriving the temperature of the fluid from a relationship of the temperatures of said elements and the derived heat transfer rates.

12. (Original) A method according to claim 11 wherein the temperature of the fluid is derived using the relationship:

$$T_t = T_{w1} + q_1 (T_{w2} - T_{w1})/(q_1 - q_2)$$

where T_t is the temperature of the fluid, T_{w1} and T_{w2} are the respective temperatures of the temperature sensitive elements and q_1 and q_2 are the respective heat transfer rates experienced by the temperature sensitive elements.

13. (Previously presented) A method according to claim 11 wherein the temperature sensitive elements are borne on a curved surface of the structure and the respective heat transfer rates are derived using the relationship:

$$\frac{\partial}{\partial r}\left[k(T)\frac{\partial T}{\partial r}\right] + k(T)\frac{\partial}{r}\frac{\partial T}{\partial r} = \rho c(T)\frac{\partial T}{\partial t}$$

where T is temperature, t is time, r is radius, ρ is density, k is conductivity and c is specific heat capacity, within the respective region within the structure.

14. (Cancelled)

15. (Previously presented) Apparatus according to claim 1 wherein said computational means are adapted to derive the temperature of the fluid using the relationship:

$$T_t = T_{w1} + q_1 (T_{w2} - T_{w1})/(q_1 - q_2)$$

where T_t is the temperature of the fluid, T_{w1} and T_{w2} are the respective temperatures of the temperature sensitive elements and q_1 and q_2 are the respective heat transfer rates experienced by the temperature sensitive elements.

16. (Previously presented) Apparatus according to claim 1 wherein the temperature sensitive elements are borne on a curved surface of the structure and said computational means are adapted to derive the respective heat transfer rates using the relationship:

$$\frac{\partial}{\partial r}\left[k(T)\frac{\partial T}{\partial r}\right] + k(T)\frac{\partial}{r}\frac{\partial T}{\partial r} = \rho c(T)\frac{\partial T}{\partial t}$$

where T is temperature, t is time, r is radius, ρ is density, k is conductivity and c is specific heat capacity, within the respective region within the structure.

17. (Previously presented) Apparatus according to claim 1 wherein said structure is elongate and adapted to be exposed to the fluid with its longitudinal axis transverse to the flow, said temperature sensitive elements being borne on a lateral surface of said structure such that, in use, said elements can face the direction of flow.

18. (Previously presented) A method according to claim 11 for measuring the flow temperature within a gas turbine engine following combustion.

19. (Previously presented) A device for use in measuring the temperature of a fluid comprising a structure bearing two temperature sensitive elements adapted to be temporarily exposed to the fluid, wherein the structure provides respective regions for the diffusion of heat from the fluid through the respective said elements, the thermal products within said regions being selected such that, in use, said elements experience different heat transfer rates when exposed to the same fluid temperature; said structure comprising a tubular member of a first material surrounding a member of a second material over part of its length and surrounding a cavity over another part of its length, the second material having a higher thermal product than the first material, a first of the temperature sensitive elements being borne on part of the surface of the said tubular member which overlies said cavity and the second of the temperature sensitive elements being borne on part of the surface of said tubular member which overlies said member of second material.

20. (Previously presented) A device according to claim 19 wherein said first material is a glass, ceramic or quartz and said second material is a metal.

21. (Previously presented) A method of measuring the temperature of a fluid which comprises temporarily exposing to the fluid a device comprising a structure bearing two temperature sensitive elements and providing respective regions for the diffusion of heat from the fluid through the respective said elements, the thermal products within said regions being selected such that said elements experience different heat transfer rates when exposed to the same fluid temperature; monitoring the respective temperatures of the temperature sensitive elements of such device over a period; deriving from respective changes of temperature of said elements the respective heat transfer rates experienced thereby; and deriving the temperature of the fluid from a relationship of the temperatures of said elements and the derived heat transfer rates; wherein the temperature sensitive elements are borne on a curved surface of the structure and the respective heat transfer rates are derived using the relationship:

$$\frac{\partial}{\partial r}\left[k(T)\frac{\partial T}{\partial r}\right]+k(T)\frac{\partial}{r}\frac{\partial T}{\partial r}=\rho c(T)\frac{\partial T}{\partial t}$$

where T is temperature, t is time, r is radius, ρ is density, k is conductivity and c is specific heat capacity, within the respective region within the structure.

22. (Previously presented) Apparatus for measuring the temperature of a fluid comprising: a device comprising a structure bearing two temperature sensitive elements adapted to be temporarily exposed to the fluid, wherein the structure provides respective regions for the diffusion of heat from the fluid through the respective said elements, the thermal products within said regions being selected such that, in use, said elements experience different heat transfer rates when exposed to the same fluid temperature; means for monitoring the respective temperatures of the temperature sensitive elements of such device over a period; and computational means for deriving from respective changes of temperature of said elements the respective heat transfer rates experienced thereby and for deriving the temperature of the fluid from a relationship of the temperatures of said elements and the derived heat transfer rates; wherein the temperature sensitive elements are borne on a curved surface of the structure and said computational means are adapted to derive the respective heat transfer rates using the relationship:

$$\frac{\partial}{\partial r}\left[k(T)\frac{\partial T}{\partial r}\right]+k(T)\frac{\partial}{r}\frac{\partial T}{\partial r}=\rho c(T)\frac{\partial T}{\partial t}$$

where T is temperature, t is time, r is radius, ρ is density, k is conductivity and c is specific heat capacity, within the respective region within the structure.

23. (Previously presented) A device for use in measuring the temperature of a flowing fluid comprising an elongate structure adapted to be temporarily exposed to the fluid with its longitudinal axis transverse to the flow; the structure bearing two temperature sensitive elements on a curved lateral surface thereof such that, in use, said elements can face the direction of flow; the structure providing respective regions for the diffusion of heat from the fluid through the respective said elements, the thermal products within which regions differ such that, in use, said

elements experience different heat transfer rates when exposed to the same fluid temperature; and without means for substantially preheating one of said elements relative to the other.

24. (Currently amended) A device according to claim ~~24~~23 wherein said structure comprises a member of a selected material the thickness of which differs in the respective said regions.

25. (New) Apparatus for measuring the temperature of a flowing fluid comprising; a device comprising a structure bearing two temperature sensitive elements adapted to be temporarily exposed to the fluid and without means for substantially preheating one of said elements relative to the other, wherein the structure provides respective regions for the diffusion of heat between the fluid and the structure through the respective said elements, and the thermal products within said regions differ such that, in use, said elements experience different heat transfer rates when exposed to the same fluid temperature; means for monitoring the respective temperatures of said elements over a period; and computational means to derive from respective changes of temperature of said elements the respective heat transfer rates experienced thereby and to derive the temperature of the fluid from a relationship of the temperatures of said elements and the derived heat transfer rates; wherein said structure comprises a member having an internal cavity at a selected location, a first of the temperature sensitive elements being borne on part of the surface of said member which overlies said cavity and the second of the temperature sensitive elements being borne on part of the surface of said member which does not overly said cavity.

26. (New) Apparatus for measuring the temperature of a flowing fluid comprising; a device comprising a structure bearing two temperature sensitive elements adapted to be temporarily exposed to the fluid and without means for substantially preheating one of said elements relative to the other, wherein the structure provides respective regions for the diffusion of heat between the fluid and the structure through the respective said elements, and the thermal products within said regions differ such that, in use, said elements experience different heat transfer rates when exposed to the same fluid temperature; means for monitoring the respective temperatures of said elements over a period; and computational means to derive from respective changes of temperature of said elements the respective heat transfer rates experienced thereby and to derive

the temperature of the fluid from a relationship of the temperatures of said elements and the derived heat transfer rates; wherein said structure comprises a member composed of first and second materials having first and second thermal products at first and second locations respectively, a first of the temperature sensitive elements being borne on part of the surface of said member at said first location and the second of the temperature sensitive elements being borne on part of the surface of said member at said second location.

27. (New) A method of measuring the temperature of a flowing fluid which comprises temporarily exposing to the fluid a device comprising a structure bearing two temperature sensitive elements, without substantially preheating one of said elements relative to the other, said structure providing respective regions for the diffusion of heat between the fluid and the structure through the respective said elements, and the thermal products within said regions differ such that said elements experience different heat transfer rates when exposed to the same fluid temperature; monitoring the respective temperatures of the temperature sensitive elements of such device over a period; deriving from respective changes of temperature of said elements the respective heat transfer rates experienced thereby; and deriving the temperature of the fluid using the relationship:

$$T_t = T_{w1} + q_1 (T_{w2} - T_{w1})/(q_1 - q_2)$$

where T_t is the temperature of the fluid, T_{w1} and T_{w2} are the respective temperatures of the temperature sensitive elements and q_1 and q_2 are the respective heat transfer rates experienced by the temperature sensitive elements.

28. (New) Apparatus for measuring the temperature of a flowing fluid comprising; a device comprising a structure bearing two temperature sensitive elements adapted to be temporarily exposed to the fluid and without means for substantially preheating one of said elements relative to the other, wherein the structure provides respective regions for the diffusion of heat between the fluid and the structure through the respective said elements, and the thermal products within said regions differ such that, in use, said elements experience different heat transfer rates when

exposed to the same fluid temperature; means for monitoring the respective temperatures of said elements over a period; and computational means to derive from respective changes of temperature of said elements the respective heat transfer rates experienced thereby and to derive the temperature of the fluid using the relationship:

$$T_t = T_{w1} + q_1 (T_{w2} - T_{w1})/(q_1 - q_2)$$

where T_t is the temperature of the fluid, T_{w1} and T_{w2} are the respective temperatures of the temperature sensitive elements and q_1 and q_2 are the respective heat transfer rates experienced by the temperature sensitive elements.